DOCUMENT RESUME

ED 470 303 TM 034 582

AUTHOR Keeney, Martha A.; Paganelli, Susan; Smith, Jevonne; Quinn, Kathy; Krane, Amy; Jacobs, Beverly; Toaz, Peggy; Ansberry, Vicky; Shultz, Lauren; Kehoe, Eve; Craven, Kristyn; Neuin, Barbara; Stepnicka, Tebra; Bruce, Carolyn; Snodgrass, Donna; Salzman, James

TITLE Lesson Study with Action Research: Is the 4-Column Writing Method 4 Real?

PUB DATE 2002-10-00

NOTE 24p.; Paper presented at the Annual Meeting of the Mid-Western Educational Research Association (Columbus, OH, October 16-19, 2002).

PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)

EDRS PRICE EDRS Price MF01/PC01 Plus Postage.

DESCRIPTORS Achievement Tests; *Action Research; *Middle School Teachers; Middle Schools; *Teacher Effectiveness; *Writing Instruction

IDENTIFIERS *Ohio

ABSTRACT

Action research is designed with the intent of assisting educators in assessing the effectiveness of their building and classroom practices. Lesson study helps teachers use ongoing collaborative peer-insight and feedback about student responses to instruction to develop high quality lessons. Middle school teachers from an outer-ring suburb of Cleveland, Ohio, combined lesson study with action research to determine whether the four-column writing method improved student responses to extended answer questions such as those found on the Ohio Proficiency Test. The four-column model is intended to be an organizer for responses, which models the process students should develop as a way to answer extended response items. Results for 160 students in the control group and 148 in the experimental group indicate that fifth graders instructed using the four-column writing method performed significantly better than those receiving other traditional writing instruction used in the same school. Three appendixes contain writing prompts, scoring rubrics, and a lesson plan for the four-column method. (SLD)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 470 303

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

M.A. Keeney

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Lesson Study with Action Research:

Is the 4-Column Writing Method 4 Real?

Solon City Schools
Martha A. Keeney - Project Director
Susan Paganelli
Jevonne Smith
Kathy Quinn
Amy Krane
Beverly Jacobs
Peggy Toaz
Vicky Ansberry
Lauren Shultz
Eve Kehoe
Kristyn Craven
Barbara Neuin
Tebra Stepnicka

South Euclid – Lyndhurst Schools
Carolyn Bruce

Cleveland State University
Donna Snodgrass, Ph.D. – Instructor
James Salzman, Ph.D. – Content Consultant

TM034582

Presented at the Mid-Western Educational Research Association Conference on October 17, 2002 in Columbus, Ohio

BEST COPY AVAILABLE

Abstract

Action research is designed with the express intent of assisting educators in assessing the effectiveness of their building and classroom practices. Lesson study helps teachers use ongoing collaborative peer-insight and feedback about student responses to instruction to develop high quality lessons. Middle school teachers from an outer ring suburb of Cleveland, Ohio, combined lesson study with action research to determine whether the four-column writing method improved student responses to **extended answer questions** such as those found on the Ohio Proficiency Test. Results indicate that fifth grade students instructed using the *4-column writing method* performed significantly better than those receiving other *traditional writing instruction* employed in the building.

A Pressing Need to Improve Students' Ability to Respond to Extended-response Items

Nationwide teachers are challenged to help students meet state standards. Most states have developed high-stakes accountability linked to performance assessments (Snodgrass & Salzman, 2002). High stakes tests, like the Ohio Proficiency Tests, signal to stakeholders the effectiveness of teaching and gauge the success of a particular school district by this single measurement. In Ohio, the results of the tests appear in district report cards with school districts delineated in the newspapers by rank order.

Ohio fourth and sixth grade proficiency tests have had content area science, mathematics, reading and citizenship extended-response items embedded in them since they were first administered. Extended-response items require the test taker to construct a written response to a prompt. Item analysis reports from the Ohio fourth and sixth grade proficiency tests show that students consistently are weaker in answering extended-response items in the content areas than answering selected-response items these same content areas. Students are in need of explicit instruction in responding to extended-response items. This is particularly true in the areas of science and mathematics on the proficiency tests. Participants in this study chose to focus on helping middle-school students improve their ability to respond to extended-response items in the area of **science**. In the science portion of the *Ohio Fourth and Sixth Grade Proficiency Tests* students are expected to interpret graphs, diagrams and brief science narratives.

The issue of creating a conceptual framework to assist Ohio students to successfully respond to extended-response items takes on new urgency with the rollout of the new Ohio Graduation Tests (OGT). The OGT is the first high school level test in Ohio that requires that students answer constructed response questions in the content

areas. With the expectation that present eighth grade students (the class of 2007) will be expected to pass Ohio Graduation Test in order to graduate from high school, teachers are faced with finding ways to help students pass extended-response items in the content areas. Mastery of content alone in mathematics, science and citizenship will not be enough for a student to graduate from high school. Students must learn to successfully answer extended-response items or *think on paper*.

To this end, a group of fifth and sixth grade teachers in collaboration with their assistant principals and university personnel embarked on a yearlong school-based investigation. This project melded action research and lesson study practices to identify and implement an instructional method that would improve middle school students' capacity to respond to extended-response items in science. Ultimately, through lesson study practices the 4-column writing method was selected. This paper reports on the results of this investigation.

Research Questions

Is there a significant difference in the quality of extended-response writing in science of 148 middle-school fifth grade students who were instructed using the 4-column writing method versus 160 middle-school fifth grade students who were instructed using other writing methods traditionally employed in the middle school building?

What impact can the melding of lesson study and action research have on the professional development of a professional school staff?

Overview and History

Action Research

Action research is designed with the express intent of assisting educators to assess the effectiveness of their building and classroom practices. Action research uses methods of inquiry, which make research techniques valuable to classroom teachers (Calhoun, 1996; Herndon & Fauske, 1994; Mills, 2000; Salzman, Snodgrass & Mastrobuono, 2002). *"Action research is a method of inquiry by which teachers investigate the effectiveness of their instructional practices by engaging in a wide range of scientific activities that can be readily and practically applied in classroom settings."*(Salzman, Snodgrass & Mastrobuono, 2002, p. 2)

Lesson Study

Lesson study and action research practices parallel and augment each other in a number of essential ways. At the core of both methods is a focus on educators using authentic student performance as feedback to evaluate the effectiveness of their own practices. *Lesson study* helps teachers use ongoing collaboratively peer-insight and feedback about student responses to instruction to develop high quality lessons. *"Lesson study programs require that teachers get together to plan instruction, to observe what happens when it's implemented, to analyze what went wrong, to come up with ideas for improving it, and try doing it again in their classrooms"* (Willis, 2002, p.7). Action research moves one-step beyond lesson study, and employs empirical and scientific techniques to help teachers evaluate the impact of the lessons on student performance.

Writing for Thinking

The ability to communicate clearly and effectively in writing is a skill that is necessary for students' success in school and life (King & Kotman, 2001). Graves (1983) and Calkins (1994) discovered that students do engage in a process when writing. *"This process, however, is a nonlinear process because it is not one that students follow straight through from start to finish. Instead, it is a series of stages such as brainstorming, drafting, revising, and editing that students involve themselves in again and again."*(King & Kotman, 2001, p.6). The challenge to teachers preparing students to respond to extended response items like those found in the Ohio Proficiency Tests is helping students to answer questions that are embedded in conceptually difficult content and thought processes and respond to those questions via the writing process. Extended-response items are often not problems of writing, but problems of thinking on paper. The 4-column writing method appears to lend itself to this challenge because it provides a conceptual framework for students to identify the question, focus on the task, identify the needed information and extend or connect one's thought through writing (Wolf & Wolf, 2002). A summary of the 4-column model for writing is as follows.

USING THE 4-COLUMN METHOD

In tackling extended-response questions, students may use the 4-column method to read the question critically, think through a plan, and write an outline for an answer prior to writing their final draft. The 4-column model is intended to be used as an ORGANIZER only, not the written response students submit. It overtly models the processes students should develop as a means to answering extended-response items. The process should become a

"habit of mind" rather than an activity one goes through to begin writing. However, students will/may have to practice the habit before it becomes a natural process for them. For students to be able to write to extended-response prompts, they must be able to:

- ✓ Read Critically
- ✓ Think Critically
- ✓ Write Critically
- ✓ Make Authentic Connections/Extensions

Table 1 presents a summary of the 4-column writing method.

Table 1

Summary of the 4-Column Writing Method

1 ***Know***	2 ***Do***	3 ***Facts/Content***	4 ***Depth/Breadth***
Subject/Topic or Prompt	Processes	Level of Proficiency	Connections/ Extensions
What's this question about?	What does the question ask me to do?	What is the specific information I will use to answer all parts of the question?	How does this question relate to other things? How can I make my answer better?
Students write what the topic of the question is about in this column (focus on the prompt).	*Students note the power verbs in the prompt and other key words that indicate the number of times something has to be done.*	*Students focus on content information to bullet in this space to guide their final response.*	*Students make specific connections to previous knowledge related to this topic.*
Students look at critical vocabulary in the prompt to set parameters for this first step.	Students stay focused on what the prompt asks them to do.	Students move to a higher level of proficiency because of completeness of response.	Students demonstrate knowledge beyond what the prompt asks.

History of the Middle School Teachers' Attempt to Prepare Students in Extended-Response Writing

We believe that it is important to point out to the reader that this project is not an isolated event in our middle school. We have collaborated on many projects in the past, but this is our first attempt at collaborating on lesson study and action research. As middle school teachers from an outer ring suburb of Cleveland, Ohio we have consistently prepared students for the proficiency tests by reviewing and practicing previously administered tests. The challenge for us was how best to teach students how to read extended-response questions from the science test, think clearly about what the question asked for and write appropriate responses. Approximately ½ of our building's fifth and sixth grade teachers collaborated with both assistant principals and university personnel to embark on a yearlong action research project in conjunction with the lesson study process to determine the impact of teaching students to use the "4-column method". The sixth grade assistant principal organized the project and served as project director.

Review of Literature

Research findings show that teaching student strategies for understanding new information in content areas are effective. Students who have had explicit guided practice in rereading, creating associations, determining superfluous information, drawing upon prior knowledge and summarizing techniques improved students' test results (Friend, 2000).

Writing across the curriculum has been successfully incorporated into many content area classrooms. Effective teachers have prepared students by guiding them through prewriting activities to aid in understanding of key concepts, helped expand questioning techniques, provided opportunities to develop conceptual knowledge through informal conversation, and shaped comprehension through teaching students to reorganize class notes (Suhor). The act of writing is an act of thought (Murray, 1985). One may not know what one has thought until it is written. Writing in the content areas has been shown to improve students' higher-order thinking skills (Sorenson, 1991). When school wide writing across the curriculum was implemented studies indicated students' writing showed variation, was more complex and indicated mature vocabulary (Sorenson, 1991).

Evidence of "poor comprehension and writing skills are often due to an individual's inability to understand text structures." Students have difficulty organizing material from expository text. The implementation of graphic organizers was designed for specific content that students were learning and the organizational pattern of the text.

Teachers modeled the thinking processes used in graphic organizers and discussed specific strategies students should use to elicit information from the text (Fisher, 2001).

The middle school teachers, who were study participants, were motivated to learn together. They felt that the most powerful and effective results would best be realized if together they developed the lesson plans, taught and then analyzed the lessons. Lesson study produces gradual but continual improvement in teaching (Stigler & Hiebert, 1999). The teachers over a period of six weeks would teach a lesson and meet to review "how the lesson went." Analyzing both the teachers' practice and lesson plans challenged the teachers to improve both delivery and lesson plan design. Teachers sharing classroom practices and analyzing "what went wrong" in an effort to improve have proven to be valuable (Willis, 2002).

METHOD:

Participants:

Three hundred and eight students in the fifth grade from a suburban middle school were divided into control and experimental groups using intact team groups. One hundred sixty students were in the control group, and 148 in the treatment group. Existing data was used to determine initial equivalence between the intact groups. Groups were compared in four areas: ***age*** and The Ohio Fourth Grade ***Science***, ***Reading*** and ***Math*** Proficiency Tests. Between group comparisons revealed that on average subjects in the treatment group were 1.04 months older than subjects in the control group, as shown in Table 2. (Control group mean age equals 131.67 months; treatment group mean age equals 132.71 months.) As shown in Table 2, the initial mean proficiency scores in science, reading and math were higher for the control group than the treatment group (control science =236.98, treatment science = 229.98; control reading = 228.34, treatment reading = 223.99; control math = 244.57, treatment math = 239.55). The mean age difference between the two groups was not statistically significant. Although the difference in mean scores between the two groups was apparent on the three proficiency tests (science, reading and math) the research team decided to proceed as planned using intact groups and adjust statistically for initial differences later, if necessary.

Instruments:

Two parallel teacher-made writing prompts were developed for extended-response questions closely matching those found on the Ohio Sixth Grade Science Proficiency Test. Both questions were administered as pre/post tests in a counterbalanced fashion to compensate for lack of alternate form reliability between questions.

See Appendix A. for copies of the writing prompts.

See Appendix B. for copies of the scoring rubrics.

Table 2

A Comparison of the Control and Treatment Groups' Initial Mean Ages in Months and Standard Scores on the Ohio Fourth Grade Science, Reading and Math Proficiency Tests

TREATMENT STATUS	AGE IN MONTHS	SCALED SCORE FOURTH GRADE SCIENCE OPT*	SCALED SCORE FOURTH GRADE READING OPT*	SCALED SCORE FOURTH GRADE MATH OPT*
CONTROL	GROUP			
Mean	131.67	236.98	228.34	244.57
N	158	158	158	158
Std. Deviation	3.950	46.812	40.115	47.300
EXPERIMENTAL	GROUP			
Mean				
N	132.71	229.98	223.99	239.55
Std. Deviation	146	148	148	148
	3.988	45.389	40.047	46.522
Total Mean	132.17	233.59	226.24	242.14

*Ohio Proficiency Test

Design:

Early in the study, teachers divided the research duties so as to collaborate as a collective group in the study. For example, one group conducted the review of literature on lesson study, action research, the 4-column writing method, and writing in the content areas from the submission of relevant literature from all members. Once the articles were read, shared and critiqued; the articles became a part of the background knowledge of the group. Another group developed the questions and anchor papers based on the Ohio Proficiency Test Scoring Guide. Yet another group was responsible for developing the lesson plans for the experimental group (see Appendix C). The 4-column method was chosen as a foundation for the lessons to assist students in analyzing the content and text structure of the question (see Appendix D.) A final group was responsible for data collection and analysis. To assist teachers in the research process, university personnel were included as collaborative research experts. One university participant served as a content area expert in writing for thinking, the other university participant functioned as a research facilitator. Once the pretest was administered, papers were collected and redistributed for scoring. Teachers scored the papers with no knowledge as to whether they represented control or experimental groups. Next, teachers began instructing the experimental group of students with the exemplar lessons developed in the 4-column method. Four of the lessons were taught in the balanced literacy language arts classes, and four were taught in science classes. Students in the experimental groups were also encouraged to use the 4-column method in other appropriate circumstances. Throughout this process, the teachers came together employing lesson study techniques to process what was working with the lessons and what needed to be changed.

All students were administered one of the questions as a pretest. For the post-test, the same prompts were used. Since the study participants could not assure prompts of equivalent difficulty for the pre and post tests, the prompts were administered in a counterbalanced fashion, with each group taking an opposite form of the test as a post-test, as shown in Table 3.

Table 3

The Administration of Forms A and B of the Pre and Post-Tests

Assignment of Alternative Test Forms	PRETEST	POST-TEST
Treatment Group One	Form A	Form B
Treatment Group Two	Form B	Form A
Control Group One	Form A	Form B
Control Group Two	Form B	Form A

RESULTS:

Table 4 shows the mean pretest scores of the treatment and control groups on the pretest. The mean pretest score for the 160 control group students was 1.25 as compared to a mean pretest score of 1.03 for the 148 students in the treatment group. The standard deviation for the treatment group was 1.049 with a standard error of .086; as compared to a standard deviation of 1.116 with a standard error of .088 for the control group.

Table 4

Comparison of Treatment and Control Group Mean Scores Obtained Using the Four Point Rubric on the Pretest

Category	Number Of Students	Mean Score	Standard Deviation	Standard Error
Treatment Group	148	1.03	1.049	.086
Control Group	160	1.25	1.116	.088

Table 5 shows the statistical comparison of the pre/post tests using a two-tailed independent t-test. Results show that there was no statistically significant difference in the pre test means ($p<.072$). There was however, a statistically significant difference in the post test means ($p<.000$). Data were analyzed for equal and unequal variances. Analysis of the t-test for equality and inequality of variances shows that subjects in the treatment group performed significantly better on the post-test than did the control group. This difference is not likely to have been caused by chance.

Table 5

Comparison of Pre and Post Test Scores of the Treatment and Control Groups Using an Independent t-test

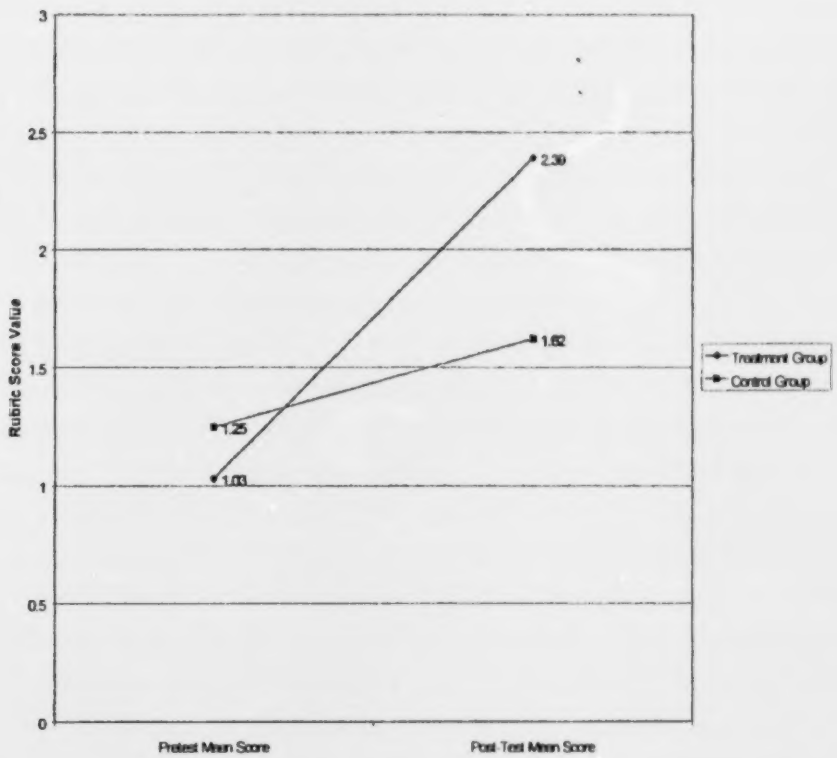
DESCRIPTION	t-test for Equality of Means		
	t value	df	Sig. (2-tailed)
PRE			
Equal variances assumed	-1.803	306	.072
Equal variances not assumed	-1.807	305.914	.072
POST			
Equal variances assumed	5.677	306	.000
Equal variances not assumed	5.659	298.604	.000

Figure 1 shows the graphical relationship between pre and posttest means for the treatment and the control group. On the pretest, the mean score for the treatment group was 1.03, as compared to the mean score of 1.25 for the control group. The post-test mean for the treatment group was 2.39, as compared to a mean of 1.62 for the control group. The difference between the treatment and control group means are not statistically significant at the $p<.05$ level. (actual p value was $p<.072$). Figure 1 shows that although the treatment group's mean score on the

pretest was lower than the control group's score, the treatment group's mean score was significantly higher than the control group on the posttest.

Figure 1

A comparison of Pre and Post-Test Mean Scores for Treatment and Control Groups



In addition to the statistical analysis of pretest and post test means for the treatment and control groups, the research team decided to survey students to see whether they perceived this particular method as having value for them. After completing the lessons and collecting data, the research team randomly selected and surveyed 46 fifth grade students from the treatment group using the *4-Column Student Survey*. The survey consisted of the following three questions:

BEST COPY AVAILABLE

In what ways was the four-column method helpful to you?

In what ways was the four-column method not helpful to you?

Would you ever use this method? If so, when would you use it?

The results indicated that 20 students would use the four-column method in the future, 22 students would not, and 4 students were indecisive. Many of the students found the method to be helpful because it made them focus on the question and organize their thoughts. One student stated, "The four-column method helped me organize my thoughts and focus on the question. When I thought I didn't know the answer, the four-column method allowed me to see my ideas written out and figure out the answer to the question."

Students who indicated they would not use the four-column method again thought that the graphic organizer took too much time to complete, and the various columns were very confusing. One student wrote, "It wasn't helpful at all because it kept on getting me confused on what to write on my final copy. It got me frustrated because I couldn't think straight with all the questions. It takes a lot of time so it would be hard to use when being timed."

Of the students who indicated they would use the four-column method again, many thought that this method would best help them on important tests, such as the *Ohio Proficiency Test*. However, a large majority expressed concerns about not having enough time to complete all of the sections of the test.

DISCUSSION:

The data indicates a significant difference in performance between students who are taught traditional building writing methods and students receiving instruction on the 4-column writing method when answering extended-response type questions in science. Furthermore, it is apparent at this point that different individuals teaching the exemplar lessons have generally similar experiences (successes and challenges). It appears as though there is evidence to support the theory that teachers can target improvement of student learning through systematic improvement of lessons brought about by professional and collaborative dialogue around those lessons. Continued learning opportunities are being explored to further examine preliminary findings.

One primary difference between action research and traditional laboratory research is that action research makes no direct attempt to design a study that's results can be generalized to other settings and populations. However, we do think that other districts with similar populations might try to replicate our methods and results. We would assist them and would be interested in their results.

We found that designing grade appropriate science writing prompts was more challenging that we initially anticipated. We discovered that if we made the writing prompts too easy, everyone got high scores. If we made the writing prompts too hard too few children could answer them. We struggled with this issue and in the end, we felt we had made the items too hard. As a result of the items being too difficult, we believe that we might have masked an even greater difference between the performance of the treatment and control groups. We will apply what we have learned here about the development of prompts in our future day to day work with students, as we will with our future research. This is just one of the ways that we began to see the relevance of research issues in our daily teaching.

We have a parallel investigation with our sixth graders, which is in process. The results will be reported in the future.

In conclusion

The results of this study suggest that 4-column writing methods significantly increases fifth grade students' ability to respond to extended-response items, such as those items found on the Ohio Proficiency Science Tests.

Teachers can find their own reality in data when provided with a framework for action research and time for collaboration. Lesson study provides a vehicle by which teachers explore and refine methods of instruction within their own particular setting. By using action research to test the effectiveness of these methods, teachers are empowered to be professionals using a process of inquiry to improve student learning. There are several key elements to keep in mind when planning such a study:

- ✓ A collaborative environment needs to be maintained throughout the study. This requires a facilitator (project director) who is skilled in group-dynamics. We believe that this facilitator should be a school-based administrator or supervisor.
- ✓ Each and every member of the group (teachers, administrators and university personnel) needs to be recognized and validated as an equal partner.

- ✓ Trust is essential for success. All participants must feel safe to express their opinions.
- ✓ Support from central office administration is essential to provide time and resources necessary to conduct a quality effort.
- ✓ University and school-based partnerships are valuable. They provide school-based staff with supplemental content knowledge and research skills. The partnerships provide university staff with a means to engage in authentic research studies and promote professional research and scientifically grounded content skills.
- ✓ Commitment from each member to follow the study through from beginning to end is essential.
- ✓ Site-based research should be encouraged within and between school districts and institutions of higher learning.

Lesson study and action research processes augment each other. Lesson study provides a means for educators to refine and improve their instruction. Action research provides educators with a means of evaluating the effective ness of the instructional practices they have developed and implemented.

REFERENCES:

Calhoun, E. F. (2002, March). Action research: Three approaches. Educational Leadership, 51 (2), 62-65

Calkins, L.M. (1994). *The art of teaching writing* Portsmouth, NH: Heineman.

Graves, D.H. (1983). Writing: Teachers and children at work. Portsmouth, NH: Heineman Educational Books.

Herndon,K., & Fauske,J. (1994). *Facilitating teacher professional growth through action research* retrieved April 16, 2002, from ERIC Document Reproduction Services Article No. 374,462.

King, Carolyn & Kotman, C. (Fall, 2002), What Makes an Effective Expository Writing Program?, Michigan Reading Journal, 34 (1), 6-15.

Mills,G.E. (2000) Action research: *A guide for the teacher researcher.* Upper Saddle River, NJ: Prentice Hall

Salzman, J.A., Snodgrass, D.G., & Mastrobuono, D.D. (2002, April), Collaborative action research: helping teachers find their own realities in data. English Leadership Quarterly. 24, 2-7.

Wolf, S.A & Wolf, K.P. (2002). Teaching True and To the Test, Language Arts, 79 (3), 229-240.

Appendix A: Writing Prompts
Appendix B: Scoring Rubrics
Appendix C: Lesson plans for 4-column method
Appendix D

APPENDIX A
FIFTH GRADE PROMPT #1

Students were given a diagram depicting an aerial view of the American Falls and Horseshoe Falls. Included in the diagram were solid lines depicting the present positions of the two falls along with dotted lines indicating the positions of the Horseshoe Falls over time (1678, 1764, and 1842). Students were given the following prompt:

Study the diagram below. Niagara Falls consists of two separate falls: American Falls and Horseshoe Falls. The lines indicate the location of the falls at that time in history. Explain why the American Falls eroded at a different rate than the Horseshoe Falls, why the shape of Horseshoe Falls has changed over the years and predict the shape and where the Horseshoe Falls will be in 50 years.

FIFTH GRADE PROMPT #2

Students were given a table labeled "Seed Germination Levels". The table consisted of two columns labeled "Percentage" and "Kind of Seed". Within each column were nine groups of seeds along with their corresponding germination level. Students were given the following prompt:

Germinate means to sprout, or to begin to develop. Seed analysts tested the seeds listed in the table below. State factors that may cause variations in the rate of germination and explain why farmers find this information useful.

BEST COPY AVAILABLE

APPENDIX B

Science Rubric

Extended-response

Extended-response items are scored on a 4-point scale using the following criteria:

4
Contains an effective solution
Shows complete understanding of the concept or task
Thoroughly addresses the points relevant to the solution
Contains logical reasoning and valid conclusions
Communicates effectively and clearly through writing and/or diagrams
Includes adequate and correct setup when required
(A four-point response may go beyond the requirements of the item.)

3
Contains minor flaws
Indicates an understanding of the concept or task
Communicates adequately through writing and/or diagrams
Generally reaches reasonable conclusions
Contains minor flaws in reasoning and/or knowledge, or neglects to address some aspect of the item

2
Indicates gaps in understanding and/or execution
Contains some combination of the following flaws:
An incomplete understanding of the concept or task
Failure to address some points relevant to the solution
Faulty reasoning
Weak conclusions
Unclear communication in writing and/or diagrams
A poor understanding of relevant scientific procedures or concepts

1
Indicates some effort beyond restating the item or copying given data
Contains some combination of the following flaws:
Little understanding of the concept or task
Failure to address most aspects of the item or solution
Major flaws in reasoning that led to invalid conclusions
A definite lack of understanding of relevant scientific procedures or concepts
Omits significant parts of the item and solution or response

0
Indicates no scientific understanding of the concept or task

BEST COPY AVAILABLE

APPENDIX C

Lesson plans for 4-column method

Lesson 1. Large Group 4-column method (Balanced Literacy)

Objective: Students will be able to utilize the **4-column** approach to attack **extended-response** items through large group discussion.

Materials: chart paper, markers, overhead projector, blank 4 column templates, and questions on overheads

(On the chart paper, the teacher should prepare a blank 4-column template, and display it from the beginning of the lesson.)

Procedure:

1. The teacher tells the class the lesson's objective: We are going to be learning a method for improving our responses to extended-response questions/essays.
2. The teacher says to the class, "I am going to put a question on the overhead to which I want each of you to respond." Teacher shows the question to the class and reads it aloud.
3. The teacher asks, "What is the question about?" Once discussion has taken place, the teacher fills in the first column, and students do the same on their templates.
4. Next, the teacher asks, "What does the question ask you to do?" Teacher should direct the discussion to focus on the important verbs in the question. Then, the teacher fills in the second column, and the students do the same on their templates. (The second column information should be numbered according to the amount of tasks requested.)

   Example:

   1. Cloud Type 1. _____
   2. Cloud Type 2. _____

5. Teacher will explain to students that numbering the tasks will create a rough outline to guide responses.
6. Once the second column is complete, the teacher will ask, "What is the specific information I will use to answer all parts of the question?" After discussion (which should focus around content), the teacher will model bulleting information under each numbered task from column 2.

   Example:

1. Cumulus Cloud
   - Sunny days
   - Fair weather
   - Dark and thunderstorms
2. Stratus Clouds
   - Low clouds

- Light rain or drizzle
- Can form low to the ground as fog

7. Give students time to fill in their templates (as you do on the chart paper).
8. The teacher says, "Now I want you to think about what else you know about the topic of the question, and the information you have identified. Briefly bullet or list what that information is in column 4." The teacher will model this process by writing information in the 4th column of the chart. (The students are making connections!)
   Example:
   - Cloud types may be affected by mountain ranges or bodies of water
   - Cloud cover may affect temperature
9. The teacher closes the lesson by telling the students that they now have an outline to use to structure their answers to extended-response questions.

Lesson 2. Large Group 4-column method (Balanced Literacy)

Objective: Students will be able to utilize the **4-column** approach to attack **extended-response** items in groups of 4.

Materials: chart paper, markers, overhead projector, blank 4 column templates, and questions on overheads

Procedure:

10. The teacher tells the class the lesson's objective: We are going to continue learning about the 4-column method to improve our responses to extended-response questions/essays.

11. The teacher refers back to the chart paper from the first lesson and reviews the 4 columns.

12. The teacher divides the class into groups of 4. Each group receives 1 sheet of chart paper, a set of markers, and 4 blank templates.

13. The teacher says to the class, "I am going to put a question on the overhead to which I want each group to respond." Teacher shows the question to the class and says, "I want someone in your group to read the question aloud. Then discuss in your groups what the question is about."

14. Then, the students will write on their blank templates what their group decided the question was about. One person from the group must write the answers on the chart paper. (Steps 4 and 5 should take about 5 minutes)

BEST COPY AVAILABLE

15. Next, the teacher asks, "What does the question ask you to do?" The students discuss the question in their groups and fill in the second column of their blank templates. One student from each group must fill in the second column on the chart paper. (The teacher should remind students to look for verbs and to number the tasks.) The teacher should walk around and check for understanding. (5 minutes)

16. Once the second column is complete, the teacher will ask, "What is the specific information you will use to answer all parts of the question?" Each group discusses the question (which should focus around content), and the teacher should remind students to bullet information under each numbered task from column 2. Students fill in the third column on their templates, and one student from each group must fill in the chart paper. (5 minutes)

17. The teacher says, "Now I want you to think about what else you know about the topic of the question, and the information you have identified. Briefly bullet or list what that information is in column 4." The teacher will remind students that they are making connections! Students fill in the 4th column on their templates, and one student must fill in the chart paper. (5 minutes)

18. The teacher calls each group up (one at a time) to share their charts.

Lesson 3. Large Group 4-column method (Balanced Literacy)

Objective: Students will be able to utilize the **4-column** approach to attack **extended-response** items with a partner.

Materials: chart paper, markers, overhead projector, blank 4 column templates, and questions on overheads

Procedure:

19. The teacher tells the class the lesson's objective: We are going to continue learning about the 4-column method to improve our responses to extended-response questions/essays.

20. The teacher refers back to the chart paper from the first lesson and reviews the 4 columns.

21. The teacher divides the class into pairs (Think, Pair, Share). Each pair receives 1 sheet of chart paper, a set of markers, and 2 blank templates.

22. The teacher says to the class, "I am going to put a question on the overhead to which I want each group to respond." Teacher shows the question to the class and says, "I want someone in your group to read the question aloud. Then discuss with your partner what the question is about."

BEST COPY AVAILABLE

23. Then, the students will write on their blank templates what their group decided the question was about. One person from the group must write the answers on the chart paper. (Steps 4 and 5 should take about 5 minutes)

24. Next, the teacher asks, "What does the question ask you to do?" The students discuss the question with their partners and fill in the second column of their blank templates. One student from each group must fill in the second column on the chart paper. (The teacher should remind students to look for verbs and to number the tasks.) The teacher should walk around and check for understanding. (5 minutes)

25. Once the second column is complete, the teacher will ask, "What is the specific information you will use to answer all parts of the question?" Each group discusses the question (which should focus around content), and the teacher should remind students to bullet information under each numbered task from column 2. Students fill in the third column on their templates, and one student from each group must fill in the chart paper. (5 minutes)

26. The teacher says, "Now I want you to think about what else you know about the topic of the question, and the information you have identified. Briefly bullet or list what that information is in column 4." The teacher will remind students that they are making connections! Students fill in the 4th column on their templates, and one student must fill in the chart paper. (5 minutes)

27. The teacher calls each pair up (one at a time) to share their charts.

Lesson 4. Individual practice with the 4-column method (Balanced Literacy)

Objective: Students will be able to utilize the **4-column** approach to attack **extended-response** items individually.

Materials: overhead projector, blank 4 column templates, and questions on overheads, notebook paper

Procedure:

28. Today, you will be using the 4-column method to structure and write a formal response.

29. The teacher passes out blank 4-column templates to each student. The teacher tells the students that they will use notebook paper to script their final responses.

30. The teacher projects the question on the overhead.

31. The students are to record on the templates in each of the columns the appropriate information.

32. Students should write their final response on notebook paper.

33. Explain to students that they are not to help each other with their responses.

34. Allow 20 minutes for students to complete the question.

35. Randomly have students share their responses to the prompt.

Lessons 5-8. Individual practice with the 4-column method (Science)

Objective: Students will be able to utilize the **4-column** approach to attack **extended-response** items individually.

Materials: overhead projector, blank 4 column templates, and questions on overheads, notebook paper

Procedure:

36. Today, you will be using the 4-column method to structure and write a final response.

37. The teacher passes out blank 4-column templates to each student. The teacher tells the students that they will use notebook paper to script their final responses.

38. The teacher projects the question on the overhead.

39. The students are to record on the templates in each of the columns the appropriate information.

40. Students should write their final response on notebook paper.

41. Explain to students that they are not to help each other with their responses.

42. Allow 20 minutes for students to complete the question.

43. Randomly have students share their responses to the prompt.

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

REPRODUCTION RELEASE

(Specific Document)

TM034582

I. DOCUMENT IDENTIFICATION:

Title: Lesson Study with Action Research: Is the 4-Column Writing Method 4 Real?	
Author(s): Martha A. Keeney, Donna Snodgrass, et. al.	
Corporate Source: Solon City Schools	Publication Date: 10-18-2002

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign at the bottom of the page.

The sample sticker shown below will be affixed to all Level 1 documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

Level 1 ↑

☑

Check here for Level 1 release, permitting reproduction and dissemination in microfiche or other ERIC archival media (e.g., electronic) *and* paper copy.

The sample sticker shown below will be affixed to all Level 2A documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2A

Level 2A ↑

☐

Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in electronic media for ERIC archival collection subscribers only.

The sample sticker shown below will be affixed to all Level 2B documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

Level 2B ↑

☐

Check here for Level 2B release, permitting reproduction and dissemination in microfiche only.

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Sign here, please

Signature: Martha A. Keeney	Printed Name/Position/Title: Martha A. Keeney, Asst. Principal	
Organization/Address: Orchard Middle School, 6800 SOM Center Rd., Solon, O. 44139	Telephone: 440-349-7440	FAX: 440-349-8054
	E-Mail Address: mkeency@solonboe.org	Date: 10-19-02

(Over)

III. DOCUMENT AVAILABILITY INFORMATION (FROM NON-ERIC SOURCE):

If permission to reproduce is not granted to ERIC, or, if you wish ERIC to cite the availability of the document from another source, please provide the following information regarding the availability of the document. (ERIC will not announce a document unless it is publicly available, and a dependable source can be specified. Contributors should also be aware that ERIC selection criteria are significantly more stringent for documents that cannot be made available through EDRS.)

Publisher/Distributor:
Address:
Price:

IV. REFERRAL OF ERIC TO COPYRIGHT/REPRODUCTION RIGHTS HOLDER:

If the right to grant this reproduction release is held by someone other than the addressee, please provide the appropriate name and address:

Name:
Address:

V. WHERE TO SEND THIS FORM:

Send this form to the following ERIC Clearinghouse:

ERIC CLEARINGHOUSE ON ASSESSMENT AND EVALUATION
UNIVERSITY OF MARYLAND
1129 SHRIVER LAB
COLLEGE PARK, MD 20742-5701
ATTN: ACQUISITIONS

However, if solicited by the ERIC Facility, or if making an unsolicited contribution to ERIC, return this form (and the document being contributed) to:

ERIC Processing and Reference Facility
4483-A Forbes Boulevard
Lanham, Maryland 20706

Telephone: 301-552-4200
Toll Free: 800-799-3742
FAX: 301-552-4700
e-mail: info@ericfac.piccard.csc.com
WWW: http://ericfacility.org

EFF-088 (Rev. 2/2001)